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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,015	05/31/2005	Hidehiro Takemoto	273268US0PCT	8512
22850	7590	06/11/2008		
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER WOOD, ELLEN S	
			ART UNIT	PAPER NUMBER
			1794	
			NOTIFICATION DATE	DELIVERY MODE
			06/11/2008	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
oblonpat@oblon.com  
jgardner@oblon.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/537,015	<b>Applicant(s)</b> TAKEMOTO ET AL.	
	<b>Examiner</b> ELLEN S. WOOD	<b>Art Unit</b> 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>01/26/2007; 08/30/2005</u> .                                  | 6) <input type="checkbox"/> Other: ____.                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-5 and 8-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. The applicant claims "***the pressure vessel has a burst pressure which is 2.2 to 2.8 times as large as a charging pressure.***" The applicant does not define "***charging pressure***" within the discloser of the invention. Is the applicant referring to charging the actual pressure vessel or the charging pressure formed from the gas with in the pressure vessel? Thus, the examiner deems the claims indefinite for failing to particularly point out and distinctly claim the subject matter. Claims 2-5 and 8 are dependent claims upon claim 1, thus indefinite.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ida et al. (US 6,190,481, hereinafter "Ida").

In regards to claim 1, Ida discloses a pressure vessel that comprises a multilayer fiber reinforced outer shell that is formed from impregnated resin fiber (abstract). The fiber reinforced outer shell is heated to be hardened after the completion of winding (col. 15 lines 63-65).

In regards to claim 2, Ida discloses that the tensile breaking strain (ductility) is 1.5% or more for the reinforced fiber (col. 28 lines 48-49).

In regards to claims 5-7, Ida discloses that the outer shell comprises a layered structure (55). The first layer is a reinforced fiber that is helically (axial) wound (56). The second layer is a reinforced fiber that is hoop (circumferential) wound (56). The layers alternate between helically and hoop wound (56). The outermost layer (8e) of the pressure vessel is hoop wound (56 fig. 3).

In regards to claim 8, Ida discloses that the inner shell is made of a thin metal such as a light alloy such as aluminum alloy (22).

In regards to claim 9, Ida discloses the method of producing a pressure vessel by forming a fiber reinforced layer, which is made of a reinforced fiber imp

Ida is silent with regards to the distortion percentage of the vessel in the circumferential direction, the burst pressure compared to the charging pressure, and the strand elastic modulus.

Ida discloses that the reinforcing fibers of the outer shell are formed at a certain angle to achieve a lighter weight, and a higher strength and higher tensile modulus for maintaining a higher internal pressure (47). The layering of the reinforcing fibers and angle of the layers also prevent the pressure vessel from bursting when a hole is

Art Unit: 1794

formed by an impact (48). Ida discloses that the pressure vessel is excellent for a CNG tank for a motor vehicle with is required to be light in weight (203). Thus, it would be obvious to one of ordinary skill in the art at the time of the invention that based on the Ida invention and what Ida discloses about the uses of the invention to design a pressure vessel with a burst pressure, which is 2.2 to 2.8 times as large as the charging pressure, and a distortion percentage of 0.7% to 0.9%.

Ida discloses that the reinforced fiber are used in the fiber reinforced layer have high strength and tensile modulus such as carbon fiber yarns (35). The instant applicant uses carbon fiber yarns for the fiber reinforced layer (pg. 10). The carbon fibers used in Ida are excellent in elastic modulus, causing little fiber breaking and fluffing during winding. It would be obvious to one of ordinary skill in the art to use a carbon fiber with an elastic modulus of 250 GPa or greater to enhance the productivity and prevent the decline of strength and impact resistance of the pressure vessel.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELLEN S. WOOD whose telephone number is (571)270-3450. The examiner can normally be reached on Monday-Friday 7-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-272-1284. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1794

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ellen S Wood  
Examiner  
Art Unit 1794

/Carol Chaney/  
Supervisory Patent Examiner, Art Unit 1794